AMENDMENT AND PETITION DELETING CORRECTLY NAMED PERSON WHO IS NOT AN INVENTOR OF INVENTION NOW BEING CLAIMED

This amendment and petition under 37 CFR 1.48(b) is to delete the name of Arthur B. Moore originally named as an inventor and who is not an inventor of the invention now being claimed.

Please charge the fee for this petition to Deposit Account No. 07-1853.

REMARKS/ARGUMENTS

In the above-mentioned Office Action, claims 100-138 were rejected as being indefinite, claims 100-103, 109, 110, 117, 118, 125, 126 and 133 were rejected as being anticipated by U.S. Patent No. 3,420,364 (Kennedy), claims 100, 102-105, 107, 109-113, 117-121, 123, 125 and 126 were rejected as being anticipated by U.S. Patent No. 5,407,718 (Popat), claims 100, 127, 129 and 131 were rejected as being anticipated by U.S. Patent No. 5,782,497 (Casagrande), claims 101 and 133 were rejected as being unpatentable over Popat in view of Kennedy, claims 106 and 122 were rejected as being unpatentable over Popat in view of U.S. Patent No. 5,842,722 (Carlson), claims 108, 114-116 and 124 were rejected as being unpatentable over Popat in view of U.S. Patent No. 4,863,772 (Cross), claims 134-136 were rejected as being unpatentable over Popat in view of U.S. Patent No. 5,198,275 (Klein), and claims 128, 130 and 132 were rejected as being unpatentable over Casagrande in view of U.S. Patent No. 4,704,317 (Hickenbotham et al.). In response thereto claims 100-138 have been cancelled without prejudice or disclaimer, and new claims 139 – 181 have been added. The claims as now pending are patentable for the reasons set forth below in Sections I, II and III.

I. The Examiner in her indefiniteness rejection contended that the term "ultraremovable adhesive" was unclear. She stated that it was unclear how "ultraremovable adhesive" differs from ordinary adhesives on a release paper.

Applicant respectfully traverses this rejection. It is stated on page 9 of the present application that "ultraremovable adhesives" stick to the paper allowing easy removable and disposal. Even though they are tacky, they do not stick to anything permanently. Generally adhesions of ultraremovable adhesives at their highest adhesion levels (to a surface such as stainless steel) are roughly half of what they are for conventional "removable" adhesives. A fundamental difference is that conventional adhesives provide complete contact with the substrate while ultraremovable adhesives provide partial contact. This limited contact is what prevents an ultraremovable adhesive from becoming permanent, over time. Also, at page 25 it states that the preferred ultraremovable adhesive can be "the FASSON water-base acrylic suspension polymer (made per U.S. Patent 5,656,705) or the CleanTac II adhesive available from Moore."

Additionally, the term "ultraremovable adhesive" is used in the art and two examples follow. U.S. Patent No. 4,548,845 (Parsons et al.) states that an "ultra-removable adhesive can be expected to have a 90 degree peel adhesion value of about 0.05 pounds per inch of test sample width, a loop tack value of about 0.1 pounds per inch of test sample width and a shear value of about one minute using a 250 gram weight."

Attached is an article from Converting Magazine December 2000, entitled "Analytical Methods Optimize Ultraremovables." It says in part that "[u]ltraremovable pressure sensitive adhesives can be defined as products which do not build up or gain peel adhesion over time and are clearly removable from the substrate."

Further it can be seen that ultraremovable (or ultra-removable or ultra removable) adhesive is a common term in the art by simply typing it into an Internet search engine, such as "Google."

Accordingly, it is respectfully submitted that the term "ultraremovable adhesive" is definite and not vague and that any rejections on the ground that it is indefinite would be improper.

II. The Examiner contended that the limitations of "printable business cards" and "when the sheet of printable business cards is fed through a printer or copier for printing operation on the printable business cards" are "intended use limitations" and are not further limiting insofar as the structure of the product is concerned.

New independent claim 139 uses the phrase "adapted to." While it is true that a statement of intended use in a preamble of a claim will often impart no structural limitations, the descriptive phrase "adapted to" imparts structural limitations. In fact, as a matter of law, language in the body of a claim following the descriptive phrase "adapted to" is a structural limitation. For example, in In re Venezia, 530 F.2d 956, 957, 189 USPQ 149, 150 (CCPA 1976), some of the claim language at issue was "a pair of sleeves of elastomeric material ... adapted to be fitted over the insulating jacket of one of said cables." Concerning the above-quoted aspect of the claim, the Court of Customs and Patent Appeals stated that "rather than being a mere direction of activities to take place in the future, this language imparts a structural limitation to the sleeve. Each sleeve is so structured and dimensioned that it can be fitted over the insulating jacket of the cable." Id. at 959, 189 USPQ at 151-152, emphasis added. (See also In re Barr, 444 F.2d 588, 170 USPQ 330 (CCPA 1971).)

It is also well settled that all claim limitations must be considered and that it is improper for an examiner to ignore specific limitations that distinguish over the cited references. See, e.g., In re Boe and Duke, 505 F.2d 1297, 1299, 184 USPQ 38, 40 (CCPA 1974).

Thus, all language in the bodies of all of the claims pending herein must be fully considered in a patentability determination.

III. There is only a single independent claim pending in this application -- claim 139. For reasons as discussed below, claim 139 is patentable over the patents to Kennedy, Popat, and Casagrande, which were the primary references applied in the Examiner's Final Rejection. The claims depending from claim 139 are patentable for at least those reasons.

Kennedy does not disclose a "sheet" construction as defined in claim 139. Rather, it shows a roll or a fan fold type of construction, which is not constructed to be "sheet" fed into a printer. The liner sheet also is not "solid" but has holes. (See FIG. 1.) Further, it does not disclose a matrix waste portion that forms part of the sheet. It even further does not teach the use of an ultraremovable adhesive as would be understood by those skilled in the art.

Casagrande shows a multi-layer lamination of translucent paper or film, thin cast film and paper. It does not describe the cardstock sheet construction and the liner sheet as claimed in claim 139. It also does not describe back sides of the cardstock sheet construction forming back side surfaces of printable business cards, as claimed. It further does not describe the use of an ultraremovable adhesive as would be understood by those skilled in the art.

Popat does not disclose printable business cards. Rather, it is directed to paper label sheets having an adhesive layer (30), which "permits the user to apply the label to another surface." Further, the labels (22) are clear, while the business cards of the present invention are opaque. It even further does not describe the use of an ultraremovable adhesive as would be understood by those skilled in the art.

Concluding Remarks

In view of the foregoing, it is respectfully submitted that the claims as now pending in this application are in condition for allowance. Reexamination and

reconsideration of the application, as amended and in view of the remarks above, are respectfully requested.

As a reminder, it is requested that the Change of Address filed by Applicant via facsimile on September 2, 2003 be entered in this application.

If for any reason the Examiner finds the present application other than in condition for allowance, she is respectfully requested to telephone Applicant's undersigned counsel at (213) 689-5142 to discuss the steps necessary for placing the application in condition for allowance.

The Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment to Deposit Account No. 07-1853. Should such additional fees be associated with an extension of time, Applicant respectfully requests that this paper be considered a petition therefor.

Respectfully submitted,

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Analytical methods optimize ultraremovables

Ultraremovable pressure-sensitive adhesives based on microspheres have always interested converters. National Starch researchers used analytical tools to develop such a product.

By Ingrid Brase, Dawn Smith and Pete Walter

Ultraremovable pressure-sensitive adhesives based on microsphere technology have always been of interest to the converting industry for their unique non-building characteristics. One of the shortcomings of these products is that they are difficult to coat; foaming and slow line speeds are the major deficiencies that have been identified. Here's some information on how a product with improved coating qualities and performance properties was developed utilizing analytical tools.

Ultraremovable pressure sensitive adhesives can be defined as products which do not build or gain peel adhesion over time and are cleanly removable from the substrate. 3M (Minnesota Mining & Manufacturing, St. Paul, MN) is noted for inventing microsphere technology and introducing it the office-products market in the form of Post Itw Notes. Since that time, the use of this class of ultraremovables has expanded into many other applications such as product labeling decals, temporary bar code labels and photo albums to name just a few.

The basic concept behind the development of the ultraremovable is the use of microspheres that will not build, but do create a strong bond which can be easily broken when a force is applied. Microspheres are created by suspension polymerization of monomers typically used to create pressure-sensitive adhesives. Polymerization occurs inside primary droplets of monomer suspended in an aqueous medium. In suspension, polymerization particle size will range from 10-100 microns versus less than 1 micron in emulsions. Additionally, microsphere suspensions are very unstable and will phase separate rapidly over time. Below left (see "Microsphere polymerization") is a schematic of the mechanisms of these two types of polymerization techniques. The net result of the suspension polymerization is the creation of small tacky spheres.

The microsphere becomes the primary component of the ultraremovable adhesive formulation. A binder is used to anchor the microspheres to the facestock. The adhesive layer is generally directly coated to the facestock to gain the maximum benefit of the microspheres (see "Microsphere coatings," previous page). Note that the microspheres are exposed on the surface of the coating. This is how the nonbuilding characteristics of the adhesive are achieved. When other pressure-sensitives are coated they form a continuous film which will wet out the surface over time and form a continuous bond. This results in higher peel adhesion and eventually a permanent bond. In the case of a microsphere, the bond with the substrate is disrupted by the microspheres allowing only point contact and thus a discontinuous bond is achieved. The microspheres are also pliable and will distort and reshape. This results in an adhesive which is reusable.

With this background, it should be clear that microspheres offer advantages in applications where removability and potential reuse is important. Formulation of these products brings with it many challenges to reap these advantages. First, as previously mentioned, the microspheres by themselves are inherently unstable in aqueous medium. This presents challenges to ensuring the finished product remains stable so it can be applied without resuspension. Binder selection thus becomes a critical element for the adhesive both for performance and stability. Particle size of the microspheres is also a factor and must take the end use requirements into account when designing the suspension polymerization conditions. These and many other factors have resulted in microsphere based products which are generally more difficult to coat than traditional emulsion based systems due to foaming caused by the addition of surfactants in the formulation and the unstable nature of the microsphere suspensions.

The objective of our studies has been to learn more about the microspheres and how they impact performance and coater characteristics to help develop a coater-ready product with improved coating and performance characteristics. To accomplish this we utilized microscopy to gain a better perspective on

how the microspheres were dispersed within the binder matrix. We studied coating characteristics using high speed photography. What follows is a summary of these studies and the results they helped us achieve.

Scanning electron microscopy (SEM) and optical microscopy were key tools in the work done to optimize the final ultraremovable adhesive formulation. As previously mentioned, the performance of the final product will be impacted by both the size of the microsphere "beads" as well as the amount of binder adhesive used. A series of formulations using microspheres of different particle sizes and different levels of binder were conducted. These are summarized below:

- Formula A: large microspheres, low level of binder
- Formula B: large microspheres, high level of binder
- Formula C: small microspheres, high level of binder

Samples were coated onto paper and evaluated for 180 deg. peel adhesion. As the above graph illustrates (see "Effect of morphology on adhesion"), performance variations were achieved by the differences in the formulation. With these results the following hypotheses were developed.

- Formula A, where the microspheres are large and a small amount of binder is used, showed the lowest peel results. Here most of the peel adhesion is due to the microspheres themselves that cannot be densely packed due to their large size.
- In Formula B versus Formula A, greater peel is achieved by raising the level of binder. A comparison of Formulas B and C shows the impact of microsphere particle size.
- In the case of Formula C, the smaller size of the microspheres allows for a smoother surface morphology and thus raises the peel values of the end-formulated adhesive.

Scanning Electron Microscopy (SEM) was used to validate these hypotheses. SEM gives good depth perception and the use of high magnification allows for examination of fine details of the coatings (see SEM photomicrographs, previous page).

The detail illustrated by these photomicrographs allows for a better understanding of the performance results that were achieved. Our hypotheses were validated. Indeed, a closer look the at micrograph of Formula C also shows that the smaller spheres are buried in the binder matrix, thus the value of the spheres to achieve point contact is also diminished.

Based on our desire to develop lower peel removability for paper applications, we focused our efforts on Formulation A. Here we were able to see the maximum impact of the microspheres and were also able to effectively use the binder to create "sockets" to hold the small spheres in place on the facestock surface. Our next step was to take a closer look at how the microspheres were distributed on the facestock surface after coating. Again, the use of SEM as a tool was critical. We examined the coating at higher magnification to gain a better resolution of the spheres themselves. Polarized-light microscopy was also used in this evaluation. A coating was stained to give maximum resolution (see "Microsphere adhesive coating"). The figure on the left shows the stained coating, and the figure on the right shows the same coating using SEM. Both are at similar magnification. The discontinuous nature of the coatings is clearly shown, as is uneven distribution of the microspheres. This serves to reduce the peel and peel build.

What happens when coat weight of the formulation is varied? Higher coat weights will result in increased packing or density of the spheres themselves as seen above (see "Impact of coat weight").

The denser packing of the spheres also impacts the performance characterisitics of the adhesive. Peel adhesion increases as more microspheres are available (see "Impact of coat weight on adhesion," below). Utilizing the microscopy studies and performance test results, a formula that gave an overall balance of performance characteristics was developed. The next step was to develop an optimal coater package for the final product. Here, use of a Faustel pilot coating unit and high-speed photography, as well as microscopy, helped us to optimize the formulation. Due to the nature of the microspheres, these formulations are more prone to film splitting than emulsions and are also more shear sensitive. Thus, preferred coating methods for these adhesives are generally Meyer rod and Reverse Gravure. Slot die, Direct Gravure and 3 Roll Reverse coating methods can also be used, but represent additional challenges to the formulator due to higher shear compared to Meyer Rod. Again, we used microscopy to gain insight into the coating morphology. A photomicrograph of a Meyer Rod coated formulation showed good overall distribution of the microspheres.

To achieve good quality coatings, thickeners were used to tailor the proper viscosity and rheology to the specific coating method. Our work to optimize coatings for reverse roll illustrates this point. Two different thickeners were used where the impact of molecular weight and degree of cross-linking was examined. Both samples were Meyer Rod coated and followed with high-speed photography. Coater Package A

gave better release from the coating head, allowing for a smooth coating, whereas Coater Package B gave a very poor quality coating (see "Microsphere coatings").

We were able to develop a microsphere-based ultraremovable with optimized properties for converting applications. The use of microscopy and high-speed photography were two key tools that aided us in gaining a better understanding of the physical properties of these formulations and coatings.

Ingrid Brase is marketing manager for pressure-sensitive and laminating adhesives with National Starch & Chemical Co. She has been with the company for 23 years, beginning her career as a starch chemist. She holds a B.S. degree in chemistry from SUNY/Oneonta and an M.B.A. from Rider University. Her colleagues Pete Walter and Dawn Smith contributed to this article.

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Definition from Pointil Systems website: www.pointil.com

Removable, Ultra:

A removable adhesive with ultra low tack, adhesion, and shear properties. It has a service temperature range of -20F to +250F, and is removable without leaving residue.